Space Weather Forecast

Issued on Tuesday 18 March 2025 at 01:29 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate class flares likely. Chance G1/Minor Storms days 2-4 due to coronal mass ejection arrivals.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with peak flare 17/1933 UTC associated with a filament eruption in the northeast.

There are sixteen regions on the visible disc. AR4025 in the northwest is the largest spot at present, with recent growth observed in it's trailing portion. AR4028 in the southeast is of similar size, with slight proliferation of intermediate spots. AR4031 in the north near centre disk continues to show minor growth. None of the above spots are showing any significant magnetic complexity, with the remainder of the spots, smaller and apparently stable. Three new regions have been noted, two in the east, one in each hemisphere and small. The final region is developing just ahead of AR4025 in the northwest, it appears to be developing moderately quickly with a risk it may interact with AR4025 in the future.

Four coronal mass ejections were observed leaving the Sun during 17 Mar, two of which may have an Earth directed component. The first notable coronal mass ejection was from a filament eruption in the northwest around 17/1030UTC, just ahead of AR4025 with ejecta clearly leaving to the west, though a faint halo can be seen later on StereoA imagery. A new sunspot formed in this location shortly after. The second notable coronal mass ejection was associated with the 17/1930UTC Moderate flare and filament eruption from a region of plage in the northeast. This coronal mass ejection mostly travelled north, but once again may have an Earth Directed component. Further analysis and modelling of all coronal mass ejections is currently on-going.

Solar Wind / Geomagnetic Activity: Solar winds showed background conditions. Speeds were slightly elevated or slow-ambient. Interplanetary Magnetic Field was weak, with the north-south component also weak and variable. Geomagnetic activity was Quiet to Active (Kp2-4).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected, with an ongoing likelihood of isolated Moderate flares.

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Solar Wind / Geomagnetic Activity: There are three main coronal mass ejections which feature in the forecast, the first is from a filament eruption which occurred in the northeast quadrant at 16/2020 UTC, possibly arriving late 19 Mar. The second coronal mass ejection was from a filament eruption in the northwest around 17/1030UTC, just ahead of AR4025 with ejecta clearly leaving to the west, though a faint halo can be seen later on StereoA imagery, possibly arriving 20 Mar. The third coronal mass ejection was associated with the 17/1930UTC M1.0 flare and filament eruption from a region of plage in the northeast, perhaps arriving early on 21 Mar.

Otherwise, the fast wind enhancement has now eased with solar wind speeds near background with no significant coronal hole enhancements expected in the period.

Mainly Quiet to Unsettled activity is expected initially, with a chance of G1-G2/Minor-Moderate storms days 2-4 (19-21 Mar) should any of three possible coronal mass ejections arrive and/or combine.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at background levels, with a slight chance of enhancement should there be any larger flares.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	40	30	30
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	50	60	60	60
Very Active	R3-R5 (X Class)	No	5	5	5	5

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	10	10	10
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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